

REMARKS

The information disclosure statement filed August 31, 2001 was acknowledged, but not placed of record in the present application. A Supplemental IDS is filed herewith, including English abstracts of German Application Nos. 19528616 and 19726456.

The drawings have been objected to due to formalities. The drawings have been amended as indicated in the attached, and in accordance with the Examiner's comments.

The specification has been objected to as failing to provide proper antecedent basis for the claimed subject matter. It is respectfully submitted that the specification need not provide antecedent basis for the claims, but merely support for the claims. The objection is therefore respectfully traversed.

Claims 4-9, 12-19 and 22-24 have been objected to as being in improper multiple dependent form. All multiple dependencies have been removed. Claims 10 has been objected to due to informalities. Claim 10 has been amended appropriately.

Claim 20 has been rejected under 35 USC 102(b) as anticipated by Hoff. The rejection is respectfully traversed.

Hoff fails to disclose a mobile telephone which can be switch to a passive mode, in which the mobile telephone detects a specific search signal and then sends a response signal to reply. Rather, Hoff specifically discloses that the transmitting means are in an inactive mode (abstract, col. 4, lines 15-16 and col. 5, lines 1-7). More specifically, Hoff provides a device for locating an object, such as a person, animal or inanimate object, within the service area divided into a plurality of geographical cells. Hence, the device for locating an object is inactive during normal operation. The device for locating an object uses minimal power required to operate a receiver. The device can be activated by a radio activation signal, In contrast to the claimed invention, the device is used passively. The device can be switched in an active mode by receiving an activation

signal. The device for locating an object in Hoff can not be switched from an active mode to a passive mode. This is not necessary in Hoff since the device has to respond to an activation signal.

Claims 1-3 have been rejected under 35 USC 103(a) as unpatentable over Singer in view of Hoff, further in view of Sanmugam. The rejection is respectfully traversed for the reasons stated in the arguments above, and for the following reasons.

Singer discloses a mobile telephone in a cellular communications system, in which a portable locator unit PLU, and which has the form of a tag, an ornamental bracelet or the like. Further, the PLU can be incorporated with appropriate miniaturization in an object, such as a belt, a watch or an earring. All of these portable locator units have simple structure, so that they can be used for localization of persons or objects. The portable locator units according to Singer are permanently in a non-activated condition. The non-activated condition does not change until the portable locator unit is activated by a search signal. After activation, the portable locator units communicate for a short time with the base station. This disadvantage of the portable locator units is that they are not able to allow the user to communicate in an active way, i.e. by active dialing and speaking or sending a short message. In this context, Singer fails to disclose use of a mobile telephone as a portable locator unit, but rather as a coexistence of a portable locator unit and a mobile telephone. The invention, on the other hand, allows a user to react in an active manner after he is located by a search signal. In this regard, the user can give information immediately about his location and other conditions. Specifically, there is no disclosure in Singer to switch the mode of the mobile telephone between an operating mode and a passive mode, as required by the claims.

Additionally, Hoff does not disclose that a mobile telephone can be switched to a passive mode, in which the mobile telephone detects a specific search signal and then sends a response signal to reply. However, the device in Hoff should not be a cellular device since it draws substantial power. Hence, there would be no reason to combine the references. Moreover, Sanmugam discloses a mobile station which can not be switched to a passive mode, and there is no home register disclosed.

Claims 10 and 11 have been rejected under 35 USC 103(a) as unpatentable over Singer in view of Hoff. The rejection is respectfully traversed for the reasons presented in the arguments above.

Claim 21 has been rejected under 35 USC 103(a) as unpatentable over Hoff in view of Signer. The rejection is respectfully traversed for the reasons presented in the arguments above.

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to withdraw the outstanding rejection of the claims and to pass this application to issue. If it is determined that a telephone conference would expedite the prosecution of this application, the Examiner is invited to telephone the undersigned at the number given below.

In the event the U.S. Patent and Trademark office determines that an extension and/or other relief is required, applicant petitions for any required relief including extensions of time and authorizes the Commissioner to charge the cost of such petitions and/or other fees due in connection with the filing of this document to Deposit Account No. 03-1952 referencing docket no. 449122010000. However, the Commissioner is not authorized to charge the cost of the issue fee to the Deposit Account.

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Respectfully submitted,

By 

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Attachments



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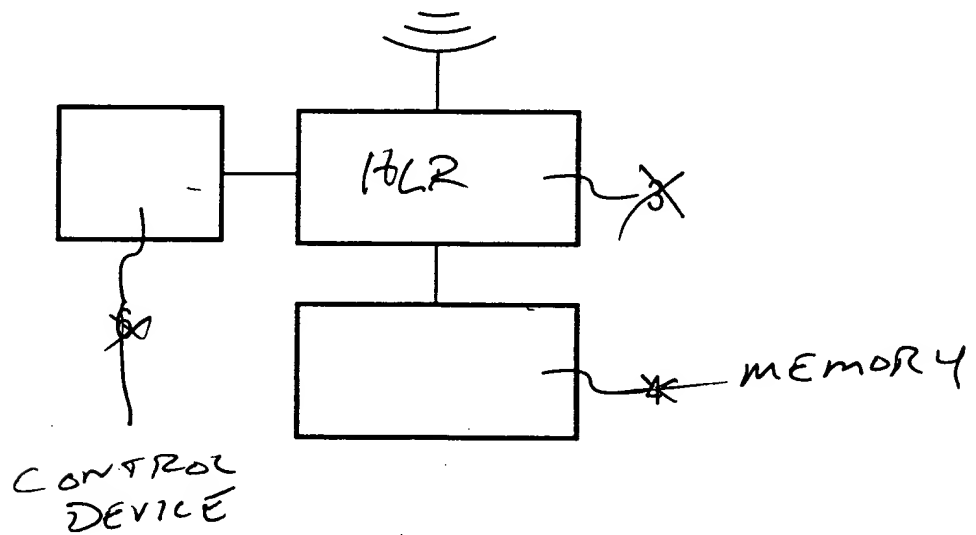
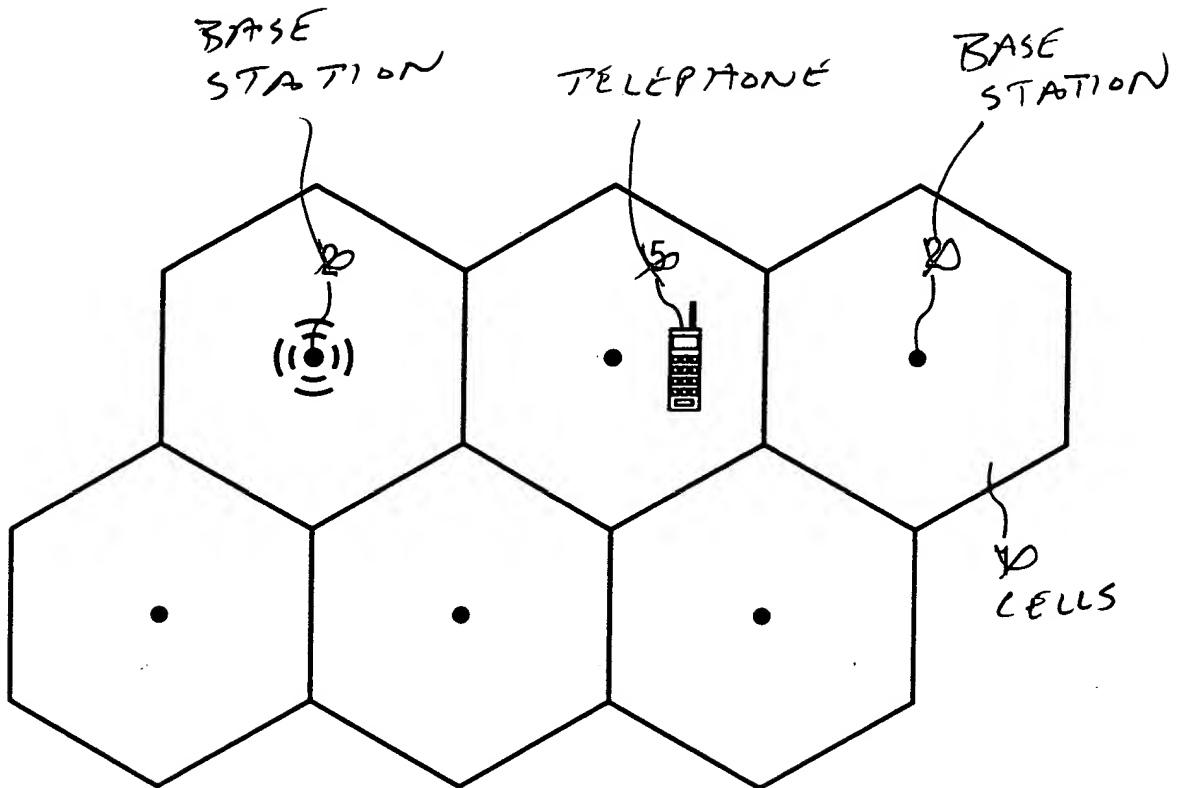


FIGURE 1

**SUBSTITUTE SPECIFICATION
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JUL 19 2004

Technology Center 2600



Description

**CELLULAR COMMUNICATIONS NETWORK AND METHOD
WITH A SEARCH FUNCTION**

5 ~~Cellular communications network with a search function~~

Claim for Priority

This application is a national stage application under
371 of PCT/DE00/00602, filed January 3, 2000, which
claims the benefit to German Application No.

10 19909314.8, filed November 29, 2000.

Technical Field of the Invention

The invention relates to a cellular communications
15 network with a search function- and a method for same.

Background of the Invention

Mobile radio systems that are intended for a relatively
20 large number of subscribers are typically cellular,
i.e. the total area to be served by a network is
divided into smaller radio cells, so-called
communications cells. The smaller the individual cells
are, the more mobile telephone subscribers can be
25 supported with a limited frequency spectrum per area.
The present radio-frequency digital communications
networks such as GSM 900 and GSM 1800 with very high
subscriber numbers have small cell sizes with radii of a
kilometer or less. The use of small cell sizes is also
30 envisaged for a future UMTS mobile radio standard. It
is thus possible, by assigning a mobile telephone to a
communications cell, to find the location of the mobile
telephone with a precision of a few hundred meters.

35 Summary of the Invention

In one embodiment of the invention, there is a
cellular communications system. The system includes,
for example, a plurality of communications cells with

at least one base station each for cordless communication with a mobile telephones; and a home location register for registration of the mobile telephones, wherein at least one of the mobile
5 telephones is configured to be switched to a passive mode, in which the mobile telephone detects a specific search signal for the mobile telephone, and emits a response signal, the home location register has a memory to store data about mobile telephones in the
10 passive mode, the base stations are configured to send mobile-telephone-specific search signals in the passive mode, the home location register has a control device which is configured to initiate at least one search operation and determines the position or status of the
15 mobile telephone as a result of response signals received by the base stations.

In another embodiment of the invention, there is a method for determining the position of a mobile
20 telephone in a communications network. The method includes, for example, emitting a specific search signal by selected base stations; recurring the response signal from the mobile telephone by one or more base stations; and determining position area where
25 the sought mobile telephone is located as a result of the response signal.

In still another embodiment of the invention, there is a mobile telephone for a cellular
30 communications network, which mobile telephone can be switched to a passive mode, in which the mobile telephone is not recognizable as a network subscriber and detects a specific search signal for the mobile telephone, and- sends a response signal in reply.

35

Figure 1 shows the structure of a communications system according to the invention.

Detailed Description of the Preferred Embodiments

5

The invention ~~is based on the object of~~
~~proposing~~proposes a positioning system for mobile
telephones for use in emergencies such as accidents or
for combating crime, in which the positioning process
10 should be possible without assistance from the mobile
telephone user.

~~The object is achieved with the cellular communications~~
~~system defined in claim 1, in which the mobile~~
15 ~~telephone to be sought can be switched to a passive~~
~~mode, in which it is not recognizable as a normal~~
~~network subscriber and.~~ In this model, the telephone
receives only a specific search signal for this mobile
telephone, and in answer to this emits a response
20 signal, which is received by one or more base stations.
As a result of the spatial distribution of the base
stations that receive the response signal, the area in
which the mobile telephone is positioned can be
determined.

25

The communications system according to the invention
has the advantage that it allows a covert search for
persons with a favorable cost/benefit ratio. The search
function can easily be integrated with software in
30 existing or future mobile radio systems such as GSM
networks and/or UMTS networks and be offered to a wide
public as an additional service.

The invention likewise proposes a method for
35 determining the position of a mobile telephone in a
cellular communications system, and a mobile telephone
for executing the search function. ~~Advantageous~~

~~developments of the invention are disclosed in the sub-
claims.~~

The mobile telephone can be switched by a user,
5 preferably by means of an identification code (PIN),
between the passive mode that allows ~~only~~ the search
function, and a normal conversation mode, and/or
switched off completely. It is not possible for a user
or caller to distinguish whether the mobile telephone
10 is switched off or is in the passive mode that permits
the search function. A covert search is thereby
enabled. The passive mode requires interaction with the
network ~~only~~ for the search operation, so that the
power consumption is lower than in the normal switched-
15 on state with roaming, and the search function can
therefore be maintained over a longer period.

It is ~~optionally~~ also possible to switch the mobile
telephone to normal operation on reception of the
20 search signal, so that the sought person can
communicate by radio with the searcher.

The search signal and the response signal can be
encrypted, so that unauthorized persons can identify
25 these signals only with difficulty, if at all.

The response signal can ~~contain~~ include encrypted
information about the locality of the mobile telephone,
which information is received via sensors such as a
30 microphone affixed to the mobile telephone.

In order to further reduce the energy consumption in
~~which~~ search mode, a periodic ready-to-receive state
can be provided, so that the search signal is
35 receivable for example for 10 seconds in each minute.

The invention is described in the following text with
~~the help of~~ reference to a preferred embodiment, ~~with~~

reference and to the accompanying ~~single~~ Figure ~~1,~~
which1.

Figure 1 shows ~~schematically~~ the structure of a
5 communications system according to the invention.

The cellular communications system has a large number
of communications cells 1, each of which has a base
station 2 with transceiver facility. With suitable time
10 and/or frequency division multiplex techniques, calls
can be made simultaneously in a single cell by several
mobile telephones 5. The cell size is between a few
kilometers and a few hundred meters or less in radius,
depending on the user density.

15 The mobile radio network has a home location register
3, in which the mobile telephones of a network operator
are registered, the call acceptance and assignment are
controlled and the billing is carried out.

20 A mobile telephone according to the invention has, as
well as the known operating states "off", in which the
mobile telephone can receive no signals at all, and
"on", when there is regular interaction with the
25 communications network, and so-called roaming, i.e. the
present position of the mobile telephone is notified to
the home location register, so that continuous
availability for calls is ensured, a further operating
state, referred to as the passive mode. In this mode,
30 the mobile telephone is not recognizable as a normal
network subscriber, and no roaming takes place.
~~The~~Rather, the mobile telephone recognizes ~~only~~ a
search signal specific to itself, and sends a short
encrypted response signal in reply. Neither the user
35 who is holding the mobile telephone, nor a caller can
find out whether the mobile telephone is in the passive
mode or switched off. The mobile telephone accessible
is ~~only~~ bringing the special search mode. The passive

mode can be activated and deactivated again by the user, preferably after entering an identification code (PIN).

5 Since, in the passive mode, there is no continuous interaction between the mobile telephone and the communications network, the mobile telephone's power consumption is lower in passive mode than in the switched-on or standby operating mode. In order to
10 reduce the power consumption further and thereby extend the operating time in the passive mode, an interval operating mode can be provided, so that the mobile telephone is ready to receive the search signal for ten seconds in each minute, for example.

15 As soon as a mobile telephone is switched to the passive mode, this is stored in a memory 4 in the home location register 3 together with its communications cell. No further information is subsequently available
20 as to the cell in which the mobile telephone is located.

The search mode can be carried out ~~only~~ by a person with authorization for this, who proves his identity
25 with an identification code, for example. These persons can be close relatives of the owner of the mobile telephone to be found, public authorities such as police or public prosecutors, or else the employer of the mobile telephone's holder. As soon as the search
30 process is initiated, the control device 6 linked to the home register 3 selects a number of base stations 2 for the first search. For this, the information on the last whereabouts of the mobile telephone before activation of the passive mode, stored in the memory 4,
35 is preferably consulted. The selected base stations 2 then send a specific search signal for the sought mobile telephone 5. If the sought mobile telephone is within range of these base stations, it sends the

encrypted response signal, which is received by one or more of the base stations. From the position of the base stations that receive the response signal, the position of the sought mobile telephone can be
5 determined relatively precisely. At the same time, the intensity and arrival time of the response signal can also be used as parameters for position finding. If the base stations receive no response signal, the search operation is extended to a wider area, and repeated as
10 necessary.

The response signal output by a mobile telephone is encrypted in duration and frequency in such a way that it can be identified ~~only~~ by a system that knows the
15 response key. Other receivers see it ~~only~~ as noise. Misuse of the search function can thus be avoided.

The mobile telephone can also be equipped with sensors such as a microphone or a temperature sensor. In the
20 response signal, encrypted information about the environment of the mobile telephone in the passive mode can then be transmitted, such as a noise, light/dark or the temperature, humidity or similar. These functions could be useful, for example, in finding kidnap
25 victims.

A further variant of the invention is ~~the provision of~~ a mobile telephone for the passive mode only. It is then possible to dispense with a keyboard or display as
30 needed for the other mobile telephone functions. The passive mobile telephone can thus be made very small and light, and it does not need to have the usual form for mobile telephones. It can be included disguised in other objects such as a printer, a clock or a pocket
35 calculator.

The invention enables a search function for a mobile telephone, which can easily be integrated in existing

and future mobile radio communications systems. A mobile telephone in the passive mode cannot be distinguished from one that is switched off. Because of the low energy consumption in the passive mode, this
5 can be maintained over a long period.

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Claims

What is claimed is:

~~Abstract~~

Cellular communications network with search function

Abstract

A cellular communications network has a large number of communications cells each with at least one base station for cordless communication with a large number of mobile telephones ~~(5)~~—and a home location register ~~(3)~~ for registering the mobile telephones. According to the invention, mobile telephones ~~(5)~~—can be switched to a passive mode, in which they are not recognizable as normal network subscribers and detect ~~only~~—a specific search signal for the particular mobile telephone—~~(5)~~, and then send a response signal. Mobile telephones in the passive mode are stored in a memory ~~(4)~~—in the home location register—~~(3)~~. The base stations ~~(2)~~—are designed to emit a mobile-telephone-specific search signal of this nature, the position of the sought mobile telephone ~~(5)~~—being determined as a result of response signals detected by the base stations—~~(2)~~.

~~(Figure 1)~~